

# Laboratory Syllabus

## PHYS 101

### **SCHEDULE - FALL 2021**

Week of	Experiment
Aug. 23	None; First week of classes
Aug. 30	None
Sep. 6	Labor Day; Kinematics in 1D
Sep. 13	Projectile Motion
Sep. 20	Forces
Sep. 27	None
Oct. 4	Uniform Circular Motion
Oct. 11	None; Mid-term recess
Oct. 18	Energy Conversions
Oct. 25	Collisions in Two Dimensions
Nov. 1	None
Nov. 8	None
Nov. 15	Angular Dynamics
Nov. 22	None; Thanksgiving break
Nov. 29	Physical Pendulum; Last week of classes
Dec. 6-7	Make-up period, two days only (special sign-up)

### **LABORATORY OBJECTIVES**

The laboratory work associated with Physics 101 has two principal goals: To give you hands-on experience with the phenomena and models you will study in class; to develop basic experimental and analytic skills that will be used throughout your career in the sciences or engineering.

The laboratory exercises that you will do here are not "experiments", in the sense of forays into the unknown designed and executed by an intrepid young scientist (you). Rather, they were chosen to illustrate physical phenomena, ingenious techniques or useful methods. They were not intended to be extremely precise, and your results will be far from exact. You will be evaluated on your understanding of the material and your approach to problems, not merely the precision of your results, and you should allocate your effort accordingly.

As one of the earliest laboratory courses in your career at Rice, PHYS 101 will emphasize very basic skills. You should develop the ability to:

1. carry out common laboratory procedures correctly and safely;
2. make measurements and report your results in physically meaningful form, including estimates of uncertainties where appropriate;
3. recognize when equipment or procedures are not working and undertake logical corrective action.

You will also have the opportunity to communicate your results in the form of short reports on each experiment. To see how these goals fit into the overall laboratory program at Rice, you can consult the overview of laboratory objectives at <http://www.owl.net.rice.edu/~labgroup/>.

## LABORATORY ORGANIZATION

Your laboratory session will meet for three hours each week that an experiment is scheduled. During the first week of class, you will have to sign-up for a lab session period using the lab preference form on Canvas. In the lab, you and your partner(s) will use the time to collect and analyze the data for the experiment, and to each prepare a brief report of your results.

Attendance at the laboratory session is mandatory. If you must miss your regular session for any reason there are two options:

- a) You may attend another session during the week, with permission from the instructor in charge of the "host" section. Permission will not be granted if the section is full. The rule for getting into a "host" section is basically "first come, first serve." Upon arriving at the lab room at the beginning of the lab section that you intend to join, you will write your name on the sign-in list on the blackboard at the front of the lab room to request a spot. The students who are enrolled in the lab section have priority over students who are not enrolled in the lab session. You cannot reserve a spot ahead of time.
- b) You may attend the make-up sessions after the last week of labs. Note that you will not be allowed to make up more than one experiment this way. If you missed more than one lab during the semester, then you can only make-up one of the labs that you missed **regardless of the reason** for why you missed any of the labs. A sign-up sheet will be provided during the last week of labs for you to schedule your attendance. The sign-up sheet will be in Herzstein Hall, Room 207. Make-up labs completed during the make-up sessions are graded by the students' regular lab instructor. Students can only make-up for experiments that they have missed due to absences. The make-up will meet from 2 pm to 5 pm in Herzstein Hall, Room 207, on December 6<sup>th</sup> and December 7<sup>th</sup>.

## LAB STRUCTURE

There will be two components to each lab, and to complete both components, students will use the Pivot Interactives platform from Vernier. The first part of each lab consists of one and more online lab exercises. These online lab exercises are labeled as “(Completely ONLINE; Could be completed before arriving at the lab room) on Pivot Interactives.” It is recommended that students attempt to complete the online lab exercises before coming to lab. These online lab exercises are designed to introduce analysis techniques, such as linearization of data and uncertainty identification and propagation, that students will need to complete the in-class component of the lab. The second component of each lab is the in-class lab exercises. They are labeled as “(Must be completed in the Lab room)” on Pivot Interactives. **You must bring your own laptop or tablet to the lab room to complete the in-class lab exercises on Pivot Interactives. The computers in the lab room are not connected to the internet!!!** As you read through the instruction for the in-class lab exercises, try to "think through" the experiment to decide what quantities you will vary, how the data should be plotted, and what you think the results should be. You may also want to lay out the data tables you think you will need and make note of useful formula.

The apparatus you will be using, although relatively simple, is remarkably expensive. Please be gentle so that neither you nor the apparatus is damaged. Particularly delicate or hazardous operations are noted in the lab instruction as they occur. Please heed the warnings. If a piece of equipment does malfunction, please tell the instructor so it can be tagged for repair. We usually have a spare with which you can finish the lab.

## REPORTS

All reporting relating to the lab are to be submitted through Pivot Interactives. All components of each lab should be submitted on Pivot Interactives at the end of the lab session that you attend. Please click “submit” when you have completed all component of each lab, so your TA will know that your lab is ready to be graded.

## GRADES

The lab grade is based on the quality of your responds on Pivot Interactives. The resulting score will be reported to the lecturer as your grade for the laboratory portion of PHYS 101. The lab grade accounts for 15% of a student's total grade for PHYS 101. However, if a student's total lab grade falls below 50%, then the student will automatically fail the entire PHYS 101 course. To ensure that no student is penalized or given an advantage for having a TA that is overly harsh in grading or overly easy, the final lab grades are normalized so that the average lab grade assigned

by each TA is equal to the average grade of the entire class. This way all students' final grades are assigned based on the same scale.

Grading is a necessary evil but you should be aware that most students do reasonable work and get good scores. A good grade is not, therefore, the most valuable thing you can get from this course.